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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/519,084

12/23/2004

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Q85504

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23373 7590 11/18/2009  
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EXAMINER

CHIU, TSZ K

ART UNIT

PAPER NUMBER

2822

NOTIFICATION DATE

DELIVERY MODE

11/18/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

sughrue@sughrue.com  
PPROCESSING@SUGHRUE.COM  
USPTO@SUGHRUE.COM

<b>Office Action Summary</b>	<b>Application No.</b> 10/519,084	<b>Applicant(s)</b> WATANABE ET AL.	
	<b>Examiner</b> Tsz K. Chiu	<b>Art Unit</b> 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21-36 and 40 is/are allowed.
- 6) ☒ Claim(s) 37-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed 7/6/09 have been fully considered but they are not persuasive. Applicant argue that Lee et al. (6844604) fail to disclose a gate insulating film, gate electrode, wherein the gate insulating film comprising two layer, first insulating film layer comprise silicon oxide and second silicon oxide film comprise of silicon oxynitride however, Lee disclose these limitation, gate insulating film (15, for example figure. 2) and gate electrode (24, for example figure. 2) stacked in this order on the substrate, wherein the gate insulating film comprising a first silicon oxide film, (12, For example Fig. 2) and a second silicon oxynitride film (14, For example Fig. 2). Therefore the rejection on claims 37-39 are proper.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 37-39 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al. (6844604).

With respect to claim 37, Lee discloses a semiconductor device stacked a gate insulating film (15, for example figure. 2) and a gate electrode (24, for example figure. 2) stacked in this order on a silicon substrate (10, for example figure. 2); wherein

said gate insulating film (15, for example figure. 2) has a layered structure having, from the silicon substrate side (10, for example figure. 2), a first silicon oxide film ((reference numbered 12; column 4, lines 9-17) column 8, lines 30-35), a metal oxide film or a metal silicate film and a second silicon oxide film ((reference numbered 14; column 4, lines 3-5) column 8, lines 30-35); and

only the second silicon oxide film ((reference numbered 14; column 4, lines 3-5) column 8, lines 30-35) has a structure in which nitrogen is introduced into silicon oxide (column 4, lines 1-5).

With respect to claim 38, Lee discloses a semiconductor device according to Claim 21, wherein said silicon substrate (10, for example figure. 2) and said gate insulating film (15, for example figure. 2) are in contact with each other, and said gate insulating film (15, for example figure. 2) and a gate electrode (24, for example figure. 2) are in contact with each other; and said gate electrode is made of either a polysilicon or a polysilicon germanium conductive film (24, For example Fig. 2).

With respect to claim 39, Lee discloses the gate insulating film contains at least one type selected from the group consisting of Zr, Hf, Ta, Al, Ti, Nb, Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu (column 8, lines 50-55).

***Allowable Subject Matter***

Claims 21-36,40 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 21 is allowable over the reference of record because none of these references disclose or can be combined to yield the claimed invention of a semiconductor device stacked a gate with gate insulating film comprises a nitrogen containing high-dielectric-constant insulating film a position at which the nitrogen concentration in said nitrogen containing high-dielectric-constant insulating film reaches a maximum in the direction of the film thickness is present in a region at a distance from the silicon substrate.

Claim 29 is allowable over the reference of record because none of these references disclose or can be combined to yield the claimed invention of a semiconductor device stacked a gate with gate insulating film comprises a nitrogen containing high-dielectric-constant insulating film a position at which the nitrogen concentration in said nitrogen containing high-dielectric-constant insulating film selectively bonds with a silicon atom in metal silicate.

Claim 34 is allowable over the reference of record because none of these references disclose or can be combined to yield the claimed invention of a semiconductor device stacked a gate with gate insulating film comprises a nitrogen containing high-dielectric-constant insulating film nitrogen is introduced only into a region lying between the position at which the silicon concentration has the minimum value and said gate electrode side interface.

Claim 40 is allowable over the reference of record because none of these references disclose or can be combined to yield the claimed invention of a semiconductor device stacked a gate with gate insulating film comprises a nitrogen containing high-dielectric-constant insulating film a position at which the nitrogen concentration in said gate insulating film reaches a maximum in the direction of the film thickness is present in a region at a distance from the silicon substrate.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tsz K. Chiu whose telephone number is 571-272-8656. The examiner can normally be reached on 0800 to 1700.

Art Unit: 2822

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra V. Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Zandra V. Smith/  
Supervisory Patent Examiner, Art  
Unit 2822

/Tsz K Chiu/  
Examiner, Art Unit 2822  
November 8, 2009